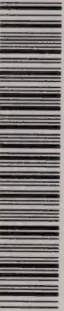


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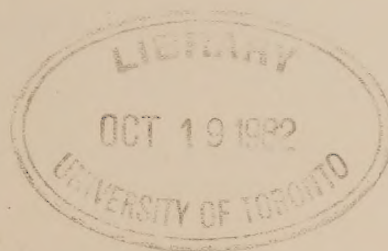
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GUIDELINES FOR THE COMPLETION OF THE  
ENVIRONMENTAL ASSESSMENT  
FOR THE ARCTIC PILOT PROJECT



Issued by the  
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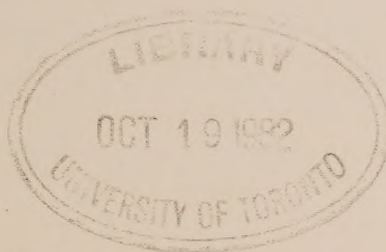
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## INTRODUCTION

These guidelines have been prepared by the Environmental Assessment Panel formed to review Petro-Canada's proposed Arctic Pilot Project. The purpose of the guidelines is to identify information that, in the opinion of the Panel, is required in order to complete the environmental assessment review of the project.

Petro-Canada submitted an Environmental Statement to the Panel in January 1979. Existing guidelines issued by previous Environmental Assessment Panels, formed to review other projects in Northern Canada, were used as a guide by Petro-Canada in preparing their Environmental Statement. Upon receipt of this document, the Panel invited comments from various government agencies. On the basis of the Panel review of both the Environmental Statement and submissions received from government agencies, the Panel issued "Draft Guidelines for Completion of the Environmental Assessment" in June 1979. Included in Part II of the Panel's document were the submissions received from government agencies. In issuing "Draft Guidelines", the Panel recognized that issues may have been included, which in the judgment of the reader may not have been significant to the project and to the study area, or, on the other hand, that it may have omitted matters that were considered to be relevant. For this reason, the Panel invited comments on the "Draft Guidelines" from the public, the proponent and

government agencies. Submissions received have been reproduced by the Panel in a document issued in September 1979 entitled: "Comments Presented to the Environmental Assessment Panel on the Draft Guidelines for the Completion of the Environmental Assessment for the Arctic Pilot Project". This information has been of considerable assistance to the Panel in formulating the final guidelines.

It is expected that Petro-Canada will observe the intent rather than the letter of the guidelines and make every effort to identify and describe all environmental impacts likely to arise from the project, even for those situations not explicitly identified in these guidelines. Any changes or major deviations from these guidelines are to be approved by the Environmental Assessment Panel prior to implementation.

It should be recognized that the Environmental Assessment and its review by the public and government agencies provides the Panel with information to enable it to determine the potential environmental impact of the project and prepare its report to the Minister of the Environment. If in the judgment of Petro-Canada, matters are included in the guidelines which are not considered to be relevant, this should be indicated in their response to the guidelines. The public and government agencies will have the opportunity to comment upon this judgment and the Panel may subsequently require additional information.



A. GENERAL

1. Project Scope

The scope of the environmental assessment review includes the following components of the proposed Arctic Pilot Project:

- a) the gas wells, gas gathering and ancillary facilities associated with the Drake Point fields;
- b) a small diameter pipeline across Melville Island to Bridport Inlet;
- c) a liquified natural gas (LNG) plant at Bridport Inlet;
- d) the shipping of LNG by icebreaking carriers through Parry Channel, and south to the approaches to a southern Canadian terminal.

In addition to the above, the Panel wishes to be kept informed during the course of this review of the plans for and status of:

- a) the review being conducted by Denmark on the movement of LNG carriers along the coast of Greenland;
- b) the off-loading and regasification facilities at a southern Canadian terminal.

## 2. Long-term Implications

The Arctic Pilot Project is considered by Petro-Canada as a "pilot" venture designed to test the feasibility of transporting natural gas from the Arctic Islands to Eastern Canada. As such, it is recognized that prior to any "full scale" development, the pilot proposal would have to be fully evaluated. It is the understanding of the Panel that any expansion from the existing proposal would be the subject of a future review by an Environmental Assessment Panel.

In view of the possible transfer of technology to other northern development activities, and the resulting expansion of shipping in the North, the Environmental Assessment should give consideration to :

- a) an indication of the interaction between the project and other concurrent industrial developments in the Arctic and the likelihood of it stimulating similar ventures which may use icebreaking vessels on a year-round basis in the Arctic, in conjunction with the co-initiator of the project, the Department of Indian Affairs and Northern Development;
- b) an indication of the government support services, in particular those associated with environmental and marine activities, that may be required and the timing of those services;
- c) a more detailed description of the proposed ongoing environmental program, in particular plans to conduct monitoring to document environmental changes resulting from the construction and operational phases of the project.



B. MELVILLE ISLAND

1. Gas Pipeline

1.1 Pipeline Alignment

In order to assess the advantages and disadvantages of possible realignment of the pipeline, a more thorough description of the alternate routes to the east of the "preferred" route should be provided along with an indication of why each was rejected.

Use of the environmental atlas to illustrate the alternate routes would be of assistance in assessing pipeline alignment.

1.2 Geotechnical

In order to assess a) the likelihood and environmental consequences of pipeline breaks (e.g. caused by frost heave, tensile stresses and earthquakes) and measures designed to minimize pipeline breaks, b) the likelihood and environmental consequences of terrain degradation along the pipeline right-of-way (e.g. caused by thaw settlement, erosion and vehicles) and planned mitigative measures, c) measures planned to ensure pipeline integrity at stream crossings and d) measures to minimize effects on the streams,

further information is required on:

- a) soil, subsoil, permafrost and ground ice conditions and an explanation of how this data has been used in developing the geotechnical and geothermal aspects of the design;
- b) typical design of stream crossings, design floods and mitigative measures planned to minimize effects on the streams;
- c) the rationale for selecting a buried pipeline as compared with an above ground pipeline;
- d) problems which may be encountered following pipeline abandonment and possible mitigative measures.

### 1.3 Construction

In order to assess the environmental implications of pipeline construction, more information should be provided on the following:

- a) the quantity, quality, availability and location of borrow material for construction of the pipeline and the facilities at Bridport Inlet;
- b) construction camps (e.g. size, location, sources and quantities of water required, and methods of waste disposal) in order to determine their potential impact;



- c) procedures envisaged to ensure pipe stability and maintenance of the right-of-way during the period between construction and commissioning of the line as well as procedures for clean-up and rehabilitation of the right-of-way following construction completion;
- .d) the location, design, construction methods and frequency of traffic for temporary and permanent access roads.

## 2. LNG Plant and Ancillary Facilities at Bridport Inlet

### 2.1 LNG Plant

In order to assess the potential impact of the liquifaction plant and associated facilities, further elaboration of the integrity of the LNG plant at the mouth of the Mecham River should be presented to include consideration of:

- a) the stability of the foreslope of the delta, including the effect on foundation performance of project - induced ground temperature changes in deltaic sediments and the effects of sediment movement, river ice discharge and flood conditions on the integrity of the facility;
- b) the likelihood and consequences of a change in the course of the Mecham River;
- c) the potential for and resulting consequences of earthquakes;
- d) mitigative measures planned to minimize problems arising from the above considerations.



## 2.2 Ancillary Facilities

With respect to the support facilities, further information should be provided as follows:

- a) an explanation as to why the various facilities cannot be further consolidated, with a consequent reduction in road construction;
- b) an explanation of the need to construct a second airport rather than upgrading the existing facility.

## 3. Contingency Planning and Project Control

Contingency plans should be outlined to demonstrate that potential impacts have been identified and means for implementing clean-up measures have been considered. Such plans should be developed to deal with:

- a) spilled diesel oil, liquified natural gas and other hazardous substances employed during the construction, testing and operational phases;
- b) emergency pipeline repairs particularly during the thaw season.

An explanation should be given as to how the proponent plans to control the project so as to enforce environmental safeguards and mitigative measures which may be required by regulatory agencies.

#### 4. Environmental Effects

In order to allow the Panel to assess the degree to which the proposed project may affect the ecosystem of the Melville Island region, additional information is required as follows on:

- a) the traditional uses by musk oxen of the well vegetated meadows along both the preferred and alternate routes, as well as the extent of musk oxen movement along the southern coast and in the Sabine Bay lowland, in order to more fully assess the degree to which the project may impact on the musk oxen (e.g. from noise, loss of habitat, harrassment) and the effectiveness of mitigative measures planned;
- b) the timing of and routes of migration of the Peary caribou inhabiting Melville Island, as well as their traditional rutting, calving and post-calving areas in order to more fully assess the degree to which the project may impact on the caribou (e.g. from noise, loss of habitat, harrassment) and the effectiveness of mitigative measures planned;
- c) a clarification of the existence of polar bear denning areas in the vicinity of Bridport Inlet and the Sabine Peninsula and possible impact of the project on polar bears;
- d) the identification of important breeding and non-breeding habitat types for Brant and other waterfowl along the pipeline routes and



in the Bridport Inlet area and mitigative measures planned to minimize the potential impact;

- e) the Bridport Inlet marine ecosystem (e.g. the seasonal and yearly variability of the biota, water circulation patterns, the impact on the biota of nutrient enrichment together with increases and decreases in water temperature) and a comparative assessment of Bridport Inlet and adjacent habitat in the same area to determine whether the Inlet is unique and of biological significance;
- f) a clarification of the nature of noise and air pollutants during construction and operation and of atmospheric stability and dispersion as it relates to ice fog occurrence, pollutant concentration and noise propagation;
- g) waste disposal to include proposed plans for operating the sanitary landfill at Bridport Inlet;
- h) fish populations and fish habitat along the pipeline route, particularly in the area of proposed borrow pits in the Meham River flood plain, in order to evaluate the effects of the pipeline on the aquatic environment and the effectiveness of mitigative measures;
- i) the potential impact of the project on archeological, historical resources, Natural Sites and Areas of Canadian Significance and areas of significance identified by the International Biological Program (IBP).

## SHIPPING

### 1. LNG Carriers

In order to assess the potential impact of shipping liquified natural gas by icebreaking carrier, additional information should be provided as follows:

- a) an indication as to whether chartered LNG carriers would be utilized with icebreaker support while the LNG vessels are in dry dock;
- b) on the development of a preliminary diagram outlining the proposed seasonal tracks of the LNG carriers;
- c) on the capability of the iceberg warning system, (e.g. the type of icebergs that can be detected, the distance of detection, the effects of reduced visibility) and on the pack-ice reconnaissance system to cope with extended periods of poor flying conditions and the polar night;
- d) on the minimum safety parameters for the dispersion of LNG spills;

- e) on contingency plans designed to minimize the effects of fuel spills;
- f) on the possible environmental effects of and contingency plans in the event of situations where LNG vessels become beset in ice or suffer disabling damage on route;
- g) an indication of plans to obtain adequate bathymetric information along the shipping route;
- h) an explanation of plans to limit the vessel tracks to a safe distance offshore and an identification of areas along the shipping route considered to be critical to the ship or to living resources;
- i) on the environmental prediction system to predict weather, ice and sea state so as to ensure a safe operation and on the adequacy of the climatological data used to design such a system;
- j) on the ability of icebreaking vessels to cope with future variations in climate, in particular as these variations affect ice conditions.



It is recognized that aspects of vessel integrity, safety and navigation will be reviewed by the TERMPOL Committee established by the Department of Transport. The review of the Petro-Canada Environmental Statement has identified questions related to the icebreaking vessels where clarification either for the benefit of the Environmental Assessment Panel or the TERMPOL Committee will be necessary. These are as follows:

- a) more detailed information on the thermal design of the ships including hull temperature distribution under winter conditions;
- b) an explanation of whether the "icing up" of a ship has been taken into account in calculations of the ship stability;
- c) a more detailed description of ballast distribution, particularly with respect to the use of additional ballasting to counteract adverse ice conditions and in the event of "run up" on an ice flow;
- d) a more detailed description of the primary, secondary and emergency navigation systems on board the LNG vessels;
- e) more detailed information on methods of dealing with LNG fire situations.

## 2. Environmental Effects

To assess the degree to which the proposed project may affect the natural environment along the shipping route, the Panel wishes to receive an indication of how Petro-Canada plans to cope with the following:

- a) the potential environmental impact of the project on marine mammals and birds in the "north water", particularly with respect to their movements in relation to sea ice conditions;
- b) with respect to the shipping route in general, the effects of the interaction of marine traffic - marine mammals and birds, in particular, the entrapment of whales in leads caused by the icebreaking, the impact that the alteration of the ice edge by icebreakers may have on marine birds and the impact on the ringed seal population;
- c) problems caused by the rates of ice closure and refreezing under varying temperature, wind and tide conditions, as well as the possible effects of the ship transits on the pattern of ice break-up in spring and subsequent effects on ice formation in the autumn;
- d) problems caused by noise from icebreaking tankers in particular as it may effect marine mammals.













